

Supplementary data

Ultrahigh Electrocatalytic Activity with Trace Amount Platinum Loadings on Free-standing Mesoporous Titanium Nitride Nanotube Arrays for Hydrogen Evolution Reaction

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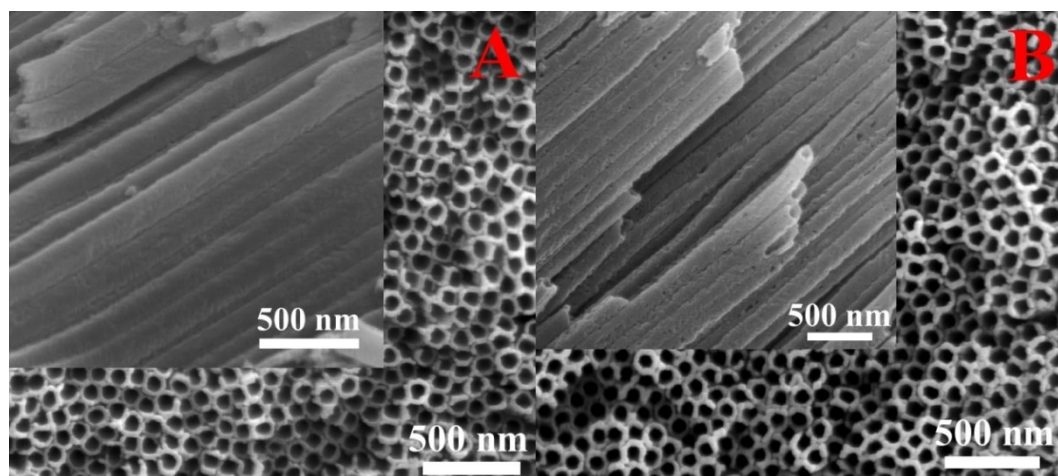
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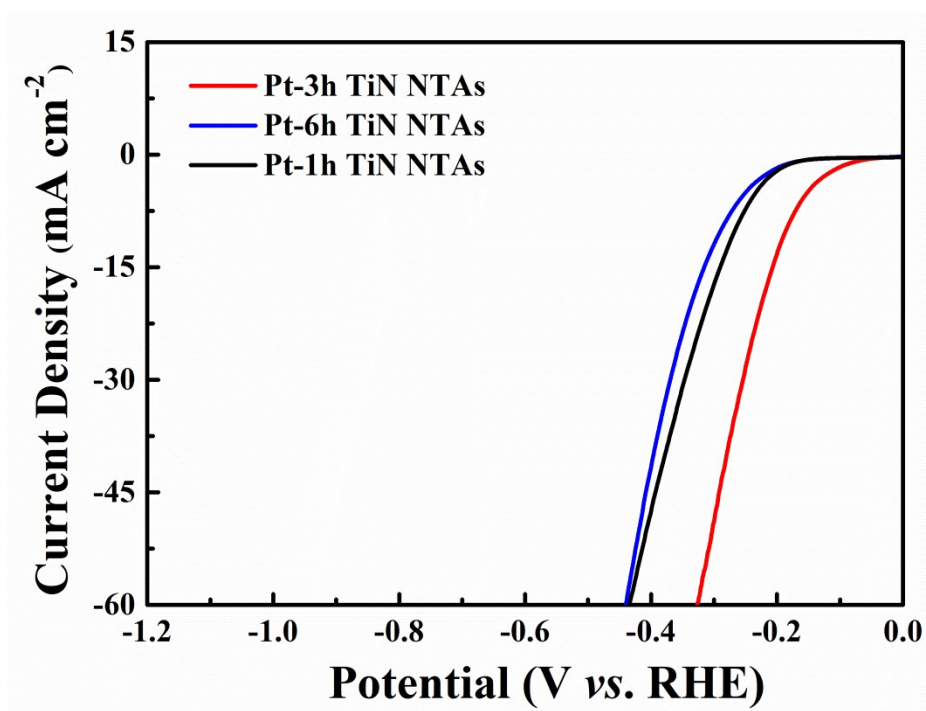
These authors contributed equally to this work.

Figure S1



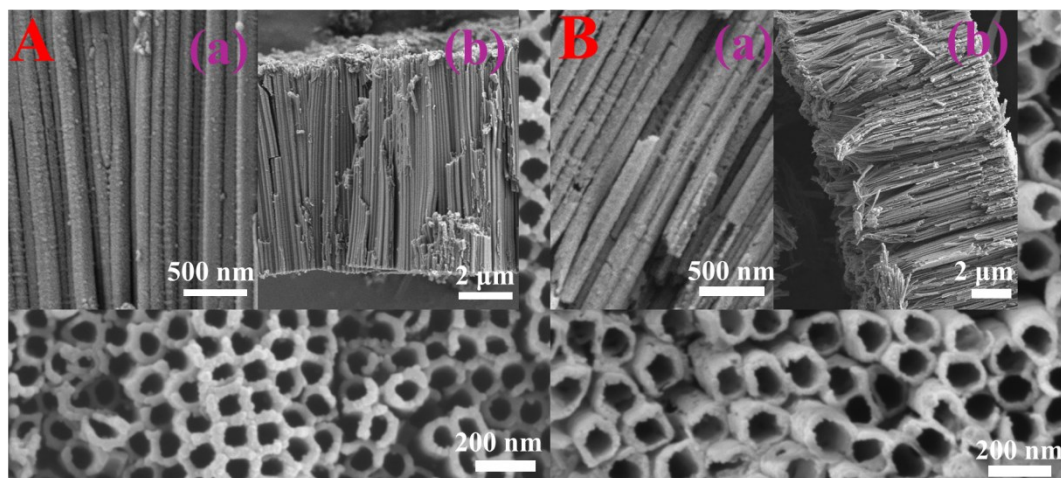
SEM images of the top-surface and cross-section (inset) morphology of TiN NTAs annealed in a tube furnace at 750 °C in NH_3 flow for 1 h (A) and 6 h (B).

Figure S2



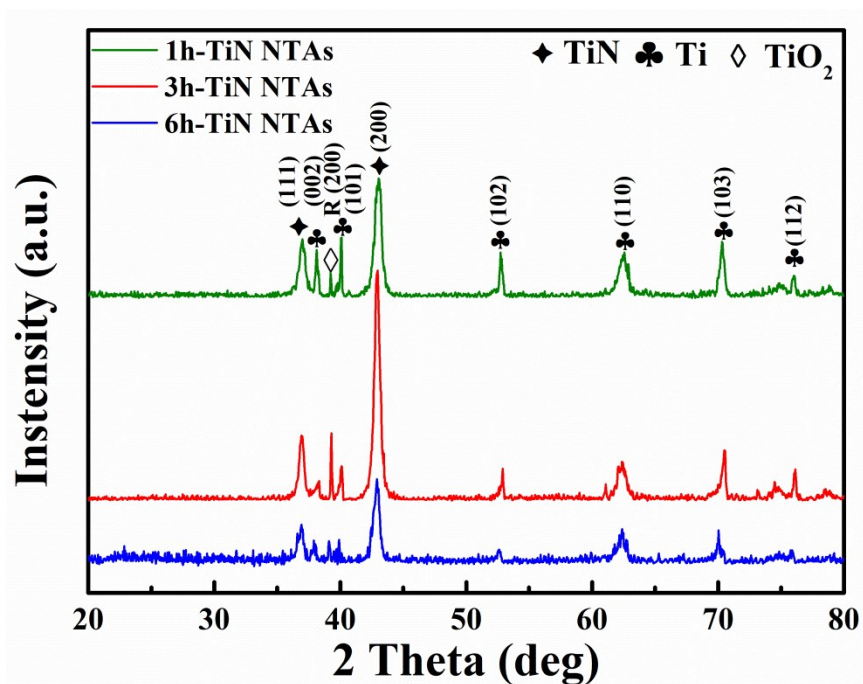
Polarization curves of electrodeposition of Pt species with successive 250 cycles on TiN NTAs treated in NH₃ flow for 1 h, 3 h and 6 h. The curves were recorded at a scan rate of 1 mV/s in 0.5 M H₂SO₄ at room temperature.

Figure S3



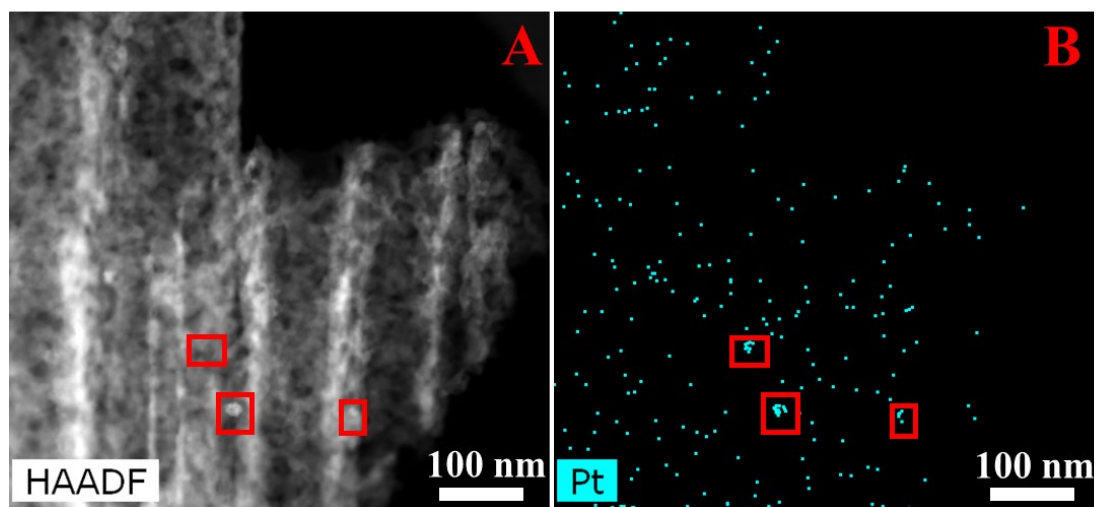
SEM images of the top-surface morphology of Pt-C/TiO₂ NTAs (A) and Pt-TiO₂ NTAs (B). Insets show cross-section morphology of the materials.

Figure S4



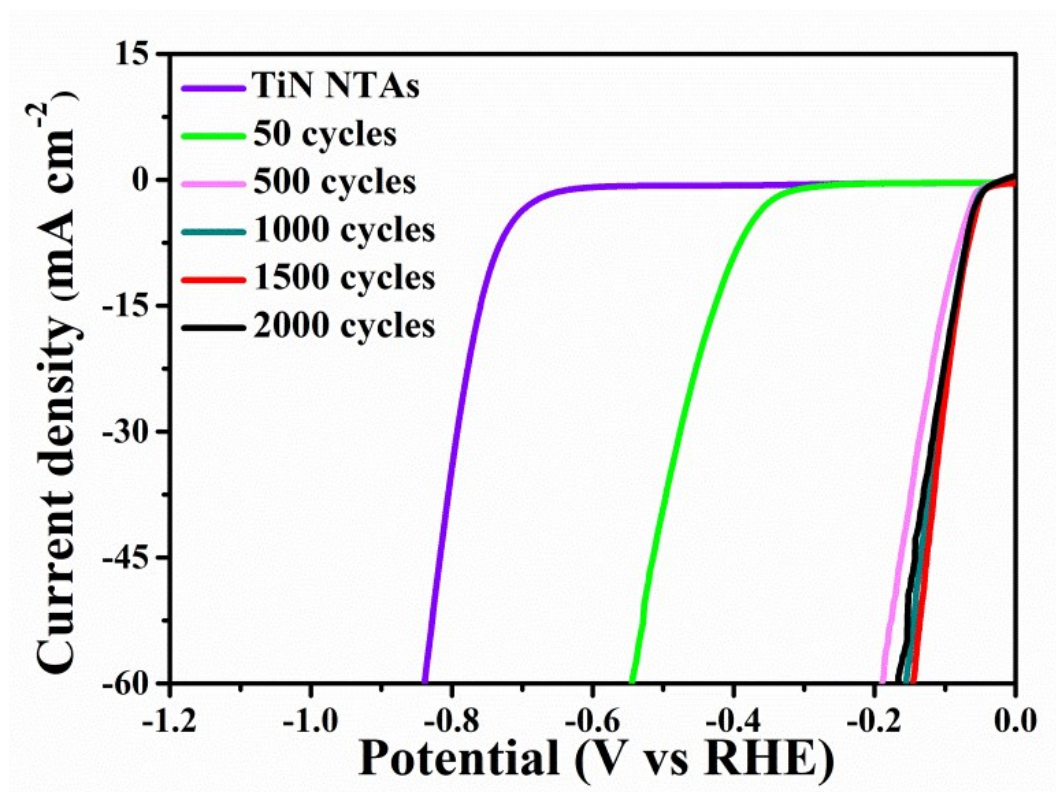
XRD patterns of TiN NTAs annealed in a tube furnace at 750 °C in NH_3 flow for 1 h, 3 h and 6 h, where R means rutile.

Figure S5



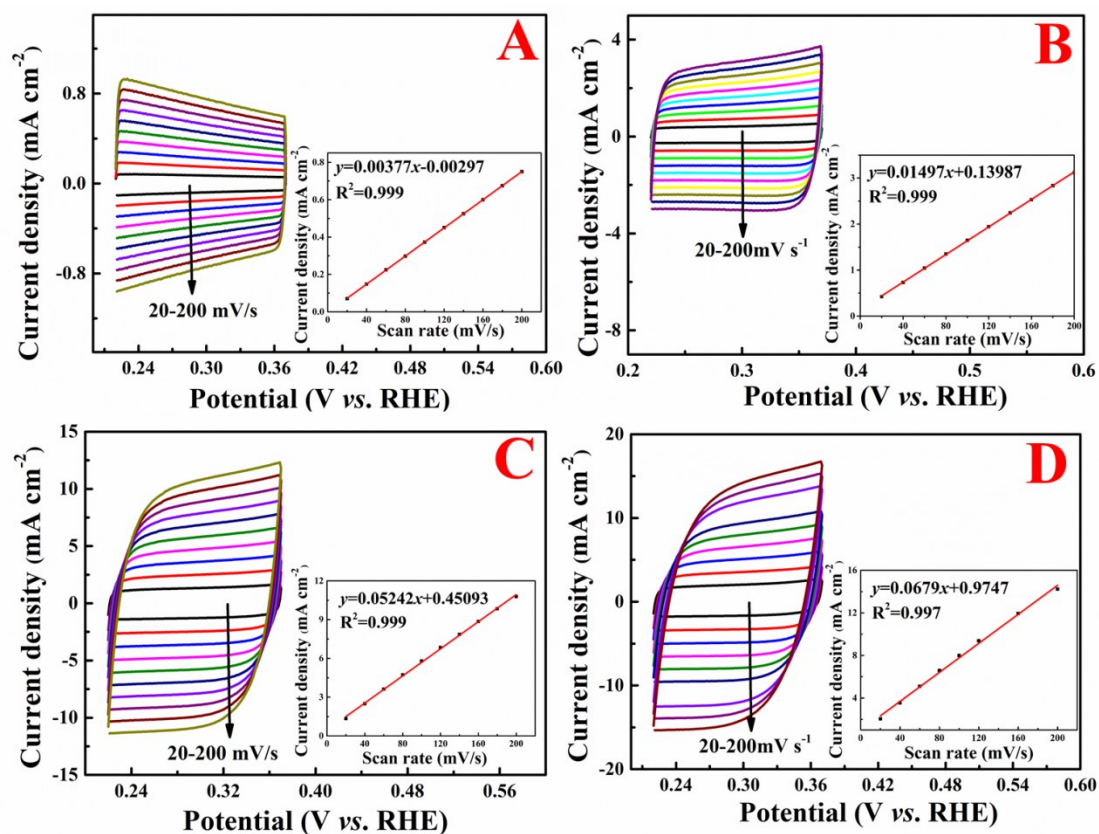
(A) TEM image of multiple nanotubes of Pt-TiN NTAs and corresponding platinum element mapping image (B). The boxes refer to the platinum particles.

Figure S6



Polarization curves of Pt-TiN NTAs with different numbers of electrochemical cycles. The curves were recorded at a scan rate of 1 mV/s in 0.5 M H₂SO₄ at room temperature.

Figure S7



CV curves of TiO₂ NTAs (A), Pt-C/TiO₂ NTAs (B), TiN NTAs (C) and Pt-TiN NTAs (D) at varying rates from 20 to 200 mV s⁻¹ in 0.5 M H₂SO₄ solution. Insets in the four figures show the linear relationship of the current density variation and scan rates.